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REMARKS

This amendment responds to the Office action of January 25, 2007. Applicants amend claims 1-3, 11, 13-15, 25-26, and 28.

In an interview today, Examiner Dinh agreed the proposed amendment sent by email on June 6, 2007 overcame the rejections of the Office action and would place the application in condition for allowance once applicants amended claims 1 and 14 to recite an antecedent basis for the package of the surface mount component in claims 1 and 14. Applicants and Examiner Dinh agreed that the amended language of claims 1 and 14 as indicated above addresses this concern.

Applicants submit claim 34 should be grouped with claim 1-29. In a PTO restriction requirement dated March 9, 2006, the Office stated claims 1-29 are drawn to a substrate and claims 30-35 drawn to the method. However, claim 34 is drawn to the substrate and dependent on allowable claim 14 which is drawn to the substrate so should be in the present application. Thus, claims 1-29 and 34 are presented for examination and only claims 30-33 and 35 are withdrawn.

In sections 1-2 of the Office action, the Examiner rejects claims 1-2, 9-15, and 22-29 under 35 USC 102(b) as being anticipated by US Patent No. 6,630,631 to Dishongh (Dishongh).

However, Dishongh cannot anticipate or render obvious amended claim 1, because Dishongh fails to describe a structure (1) where the surface mount component package has an upper surface with solderable terminal sides and a terminal end, and (2) a conductive pad that extends beyond the solderable terminal sides of the surface mount component to increase solder formation between the conductive pad and the solderable terminal sides as recited in amended claim 1.

As shown in Figure 2, Dishongh's ball grid array (BGA) package has no solderable terminal sides on its upper surface for connecting to the PCB. Instead Dishongh's (BGA) package connects to the PCB through an array of solder balls formed on the bottom

1 surface of the package (See Figures 1-2, col. 1, lines 13-30 and col. 2, line 51 through
2 col. 3, line 25).

3 As illustrated in our Figure 4A, the solder mask 54 exposes a part of the conductive
4 pads (e.g., the arms 96, 97) that extends beyond terminal sides 75, 76 of the
5 component 53 to facilitate solder formation (e.g., solder joints 41, 51) between the
6 conductive pad and the terminal sides 75, 76 and the solder mask 50 prevents solder
7 formation at the terminal end to avoid solder wicking into the plated via 55.

8 Amended claim 1 captures these differences in requiring a substrate with a via and pad
9 structure for connecting a surface mount component to conductive layers of the
10 substrate, wherein the surface mount component includes a package having an upper
11 surface with solderable terminal sides and a terminal end, comprising:

12 a substrate;
13 a plated via connected to the conductive layers;
14 a solder mask surrounding the plated via; and
15 a conductive pad with a conductive trace connected to the plated via, wherein the
16 solder mask exposes a part of the conductive pad that extends beyond the solderable
17 terminal sides of the surface mount component to increase solder formation between
18 the conductive pad and the solderable terminal sides.

19 Figure 4A and paragraph 0021 of published specification, for example, support this
20 amendment to claim 1.

21
22 In view of the above, amended claim 1 and its dependent claims 2, 9-15, and 22-29 are
23 patentable over Dishongh.

24 In addition, dependent claims 2 -13 are separately patentable because each further
25 require, among other limitations, that the solder mask covers and reduces solder
26 formation at the terminal end of the surface mount component.

27
28 In sections 3-4 of the Office action, the Examiner rejects claims 3-8 and 16-21 under 35
29 USC 103(a) as being unpatentable over Dishongh in view of US Patent No. 5,384,433
30 to Osann, Jr. et al. (Osann).

1 As mentioned Dishongh's BGA package has no solderable terminal sides on the upper
2 surface but instead connects through the solder balls on the bottom surface of the
3 package.

4 Osann fails to make up for the basic deficiency of Dishongh. For example, Osann fails
5 to provide a solder mask on the conductive pads (see e.g., the lands 50, 52, 54, and 56
6 in Figure 5). As shown in Figure 5, Osann's exposed lands extend beyond the
7 solderable terminal ends of components 46 and 48 will generate solder formation, which
8 promotes solder wicking into the via holes. Thus, Osann provides no solution much less
9 recognition of the solder wicking problem.

10 Amended claim 14 captures these differences in requiring a substrate with a plurality of
11 via and pad structures for connecting a surface mount component to conductive layers
12 of the substrate, wherein the surface mount component includes a package having an
13 upper surface with first solderable terminal sides and a first terminal end and second
14 solderable terminal sides and a second terminal end, comprising:

15 a substrate;

16 a first plated via connected to the conductive layers;

17 a first solder mask surrounding the first plated via;

18 a second plated via connected to an associated conductive layer;

19 a second solder mask surrounding the second plated via;

20 a first conductive pad with a conductive trace connected to the first plated via,
21 wherein the first conductive pad includes a portion that is exposed to solder and
22 extends beyond the first terminal sides of the surface mount component to increase
23 solder formation along the first solderable terminal sides; and

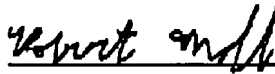
24 a second conductive pad with a conductive trace connected to the second plated
25 via, wherein the second conductive pad includes a portion that is exposed to solder and
26 extends beyond the second solderable terminal sides of the surface mount component
27 to increase solder formation along the second solderable terminal sides.

28 In view of the above, amended claim 14 and its dependent claims 16-21 are patentable
29 over Dishongh and Osann for reasons similar to those presented in connection with
30 amended claim 1. Claims 3-8 depend from allowable claim 1.

1 In addition, dependent claims 15-28 are separately patentable because each claim
2 further requires, among other limitations, that the first solder mask covers and reduces
3 solder formation at the first terminal end of the surface mount component and the
4 second solder mask covers and reduces solder formation at the second terminal end of
5 the surface mount component.

6 Please call if you have any question or comment regarding this amendment.
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9 Respectfully Submitted,
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